Quiz 5 Key
BI-102-2, Fall '08, Dr. C. S. Tritt

Each problem scored on a 10 point scale and resulting total divided by 0.60 to put score on a 100 point basis.

1. Explain what *Okazaki fragments* are and, in particular, why they are formed.

Okazaki fragments are the relatively sort segments to DNA formed on the 5' to 3' template strand during DNA replication. This is necessary because DNA polymerase III can only form DNA from the 5' to 3' direction and DNA synthesis is anti-parallel.

2. What are telomeres? Why are they necessary and what is their role during DNA replication (this is really just one question)?

Telomeres are 5' to 3' segments of DNA synthesized by telomerase without a DNA template. Telomeres are rich in repeats and G bases. Telomeres are necessary because they provide a template for RNA primer formation during Eukaryotic DNA replication. Without telomerase activity and telomeres chromosomes become a little shorter after each cycle of replication. This limits the number of times a cell can divide. Many cancer cells have excessive telomerase activity.

3. Briefly but specifically explain what introns and exons are.

Introns are intervening sequences that exist between exons. Exons are expressed sequences. Introns are removed from RNA transcripts prior to translation. Alternate splicing sometimes occurs resulting in different combinations of exons being included in the mature transcript and thus different proteins between produced from the same DNA segment.

4. Explain what it means to say a tRNA molecule has been "activated."

It has had its corresponding amino acid attached to it and is ready to be used in translation (protein synthesis).

5. Briefly explain what *operons* are and give an example of one that has been well studied (this could be any of the ones used as examples in the textbook).

Operons are segments of DNA under common control. All the genes in an operon are expressed under the same conditions, as a unit. Operons consist of an operator, a common promoter, and one or more structural genes.

6. State the currently accepted view of the role of DNA methylation in the control of gene expression.

It is now believed that DNA methylation is primarily involved in keep inactive DNA switched off (unexpressed).